

Exams & Review Sessions

Midterm 1: September 27th (in class)

Review with Lecturers: September 25th from 5:00 PM to 6:50 PM in 1GH 319

Review with Teaching Assistants: September 26th from 7:00-8:30 PM in 31 PSYCH

Midterm 2: October 30th (in class)

Review with Lecturers: October 25th from 5:00 PM to 6:50 PM in 1GH 223

Review with Teaching Assistants: October 29th from 7:00-8:30 PM in 31 PSYCH

Midterm 3: December 11th (in class)

Review with Lecturers: December 6th from 5:00 PM to 6:50 PM in 1GH 223

Review with Teaching Assistants: December 10th from 7:00-8:30 PM in 31 PSYCH



1) Tuesday, Sept. 18: Theory of Mind

**2) Thursday, Sept. 20: finish Theory of Mind
Conceptual Development 1**

3) Tuesday, Sept. 25: Conceptual Development 2

Thursday, Sept. 27: EXAM 1

4) Tuesday, Oct. 2: Eyewitness Testimony

5) Thursday, Oct. 4: Culture and Development

Theory of Mind

September 18, 2012

Theory of Mind (ToM)

- What is “theory of mind”?

[movie: Heider & Simmel, 1944]

Theory of Mind (ToM)

- What is “theory of mind”?
 - the ability to understand other people’s actions (and other external manifestations) in terms of their internal mental states
 - used to make sense of our social world

Theory of Mind (ToM)

- An ability we use constantly:
 - obviously, when we try to understand *why* other people do what they do
 - when we understand and produce language
 - sarcasm
 - malaprops
 - “Lisa’s date with density” (The Simpsons)

Theory of Mind (ToM)

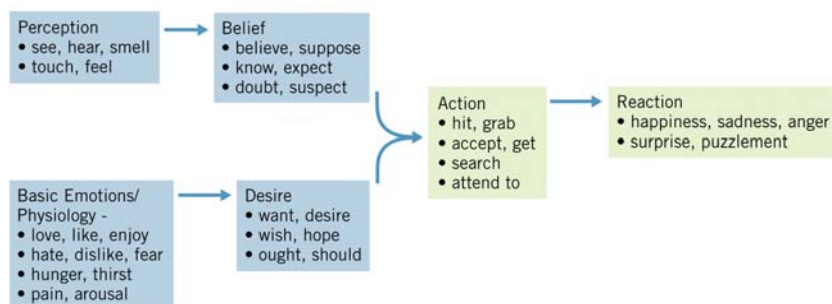
- An ability we use constantly:
 - When we decipher facial expressions, body posture, etc.



Why is it called a “theory”?

You have to call on unobserved entities and laws to explain what you observe.

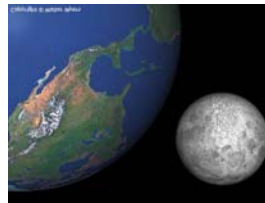
It's testable and makes predictions.



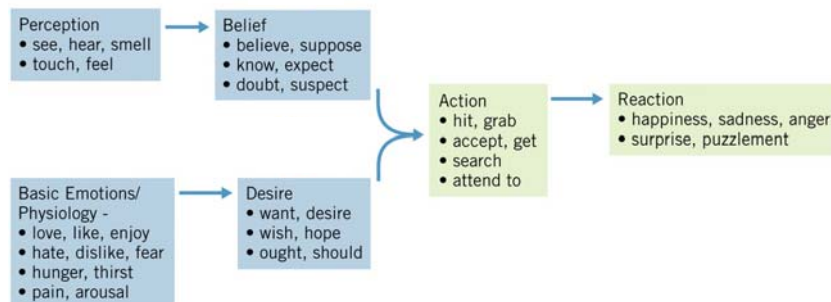
Why is it called a “theory”?

Assumed similar to scientific theories:

$$F = G \frac{m_1 m_2}{r^2}$$



How does this theory develop? How much of it do young infants have?



Precursors in neonates

Meltzoff & Moore (1977,1983)

Imitation in newborns



Precursors in neonates

Meltzoff & Moore (1977,1983)

Imitation in newborns



- Infants as young as 42 minutes; average = 32 hrs.

- Behaviors:

- tongue protrusion
- mouth opening

Q: Why is imitation of facial behaviors is good test case of neonatal imitation? What makes it more difficult than imitation of, say, hand gestures?

Precursors in neonates

Meltzoff & Moore (1977,1983)

Imitation in newborns

- What does this mean?

- innate mapping/equivalence between self and other – others are “like me”

- gives babies a foothold into the social world

Precursors in neonates

Meltzoff & Moore (1977,1983)

Imitation in newborns

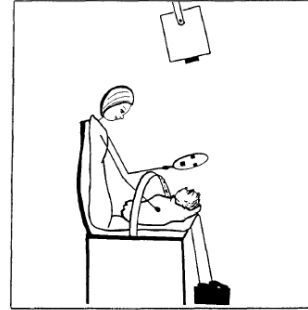
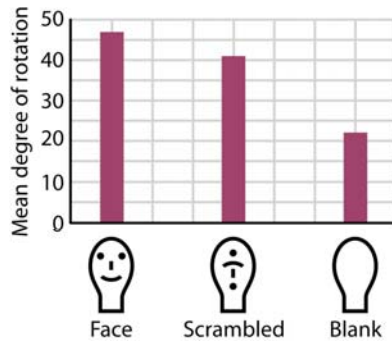
- Possible next steps in the development of a theory of mind:

- Learn what the outer expression of one's own mental states looks like – e.g., what do I do when I want something?

- Project your mental state from self to other: When I see you act in a certain way, I project onto you the mental state that would have led me to perform that behavior.

Precursors in neonates

Preference for faces

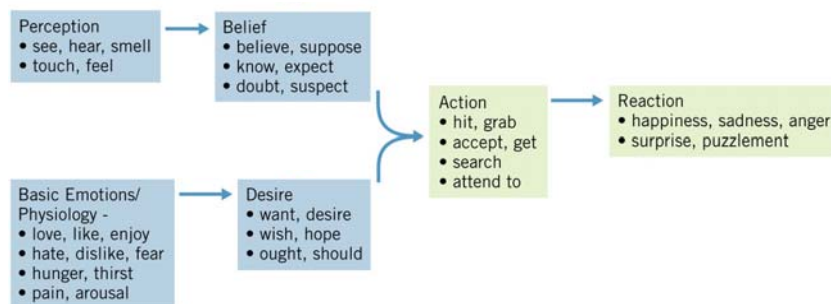


Newborns track a normal schematic face longer than a scrambled or a blank face (Johnson et al., 2001).

Why might this be important?

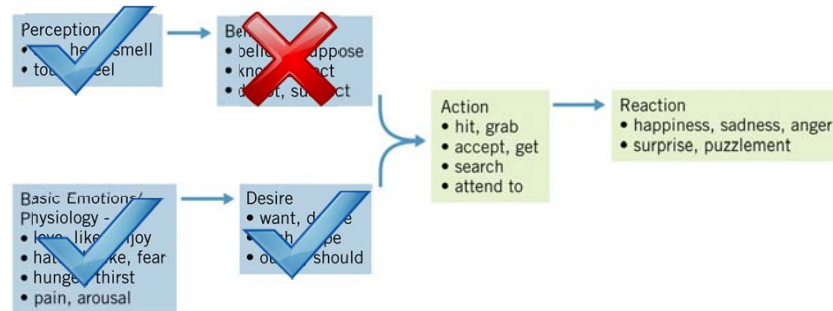
Increased attention to people = more opportunities to learn about them!

How about older infants?



Which of the ToM components do babies acquire by the age of 2?

Until a few years ago, the answer seemed pretty clear ...



Infants' understanding of others' ...

- Perception
- Basic emotions
- Goals/desires

Infants' understanding of others' ...

(Visual) Perception

- measure: gaze following and attentional orientation

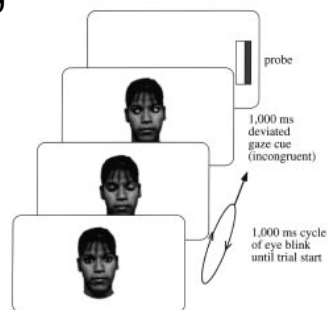
- why is this a good measure?

if you following someone's gaze, that (most likely) means you've understood that they are looking at something and you want to see what it is

Infants' understanding of others' ...

(Visual) Perception

- under ideal circumstances, even 3-month-olds orient their attention to where a person is looking



Infants slower to orient to the probe when its location is incongruent with that specified by the direction of eye gaze.

Hood et al., 1998

Infants' understanding of others' ...

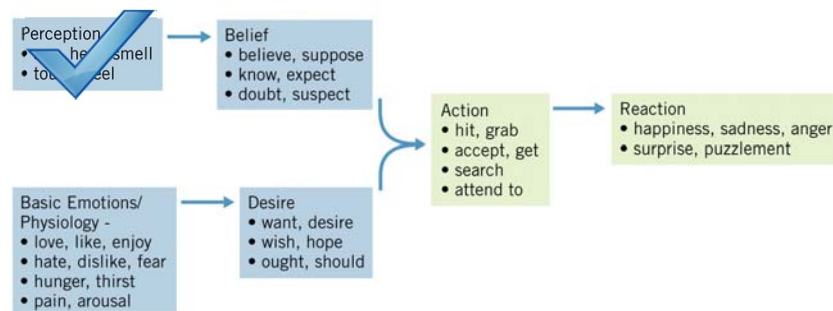
(Visual) Perception

- babies still have a lot to learn, though
- for example, at 12 months they follow the “gaze” of a blindfolded person – unless they experience the blindfold themselves!



Meltzoff & Brooks, 2008

Until a few years ago, the answer
seemed pretty clear ...



Infants' understanding of others' ...

Basic emotions

- 2 examples:

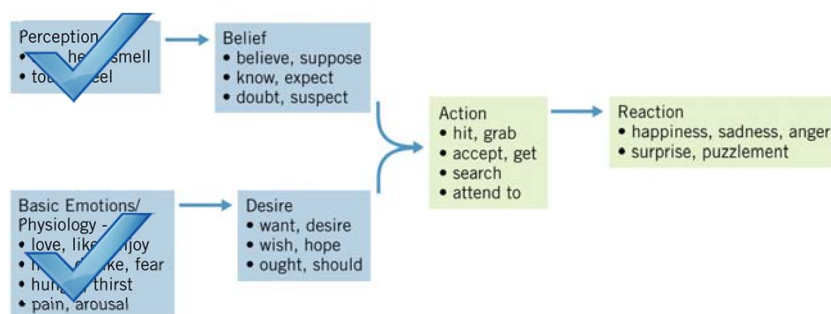
- empathy

for example, infant and adult play with toy hammers, then adult pretends to get hurt – measure the infant's reaction (e.g., Sigman et al., 1992)

- social referencing

in ambiguous situations (such as in the presence of some novel stimuli), infants look to adults/parents for emotional cues – if the parents acts scared, children are cautious; if parents act happy/relaxed, children explore

Until a few years ago, the answer seemed pretty clear ...



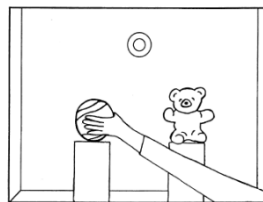
Infants' understanding of others' ...

Desires/preferences

- even 6-month-olds understand that a reach is goal-directed (Woodward, 1998)

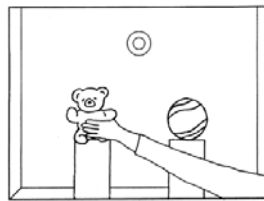
Woodward study

Habituation:

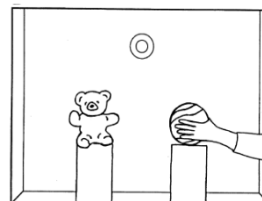


SWITCH TOY POSITIONS

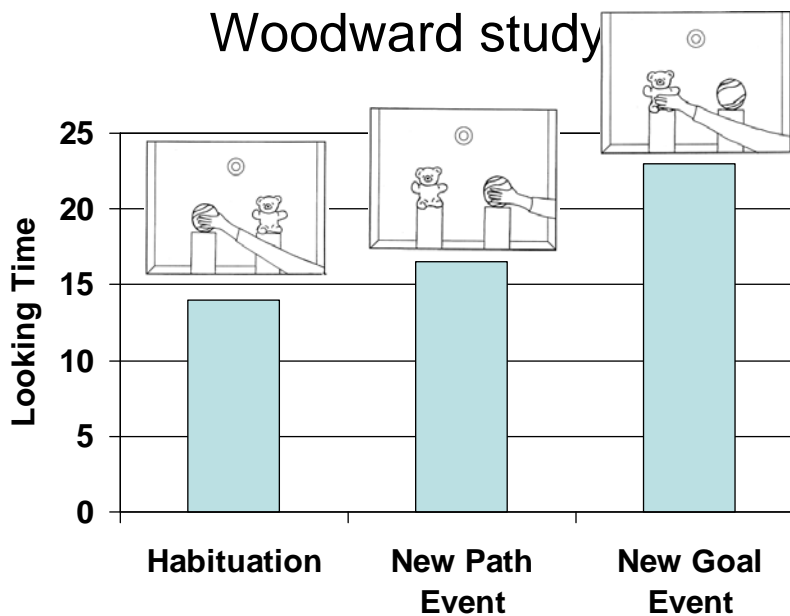
Test:



AND



Woodward study



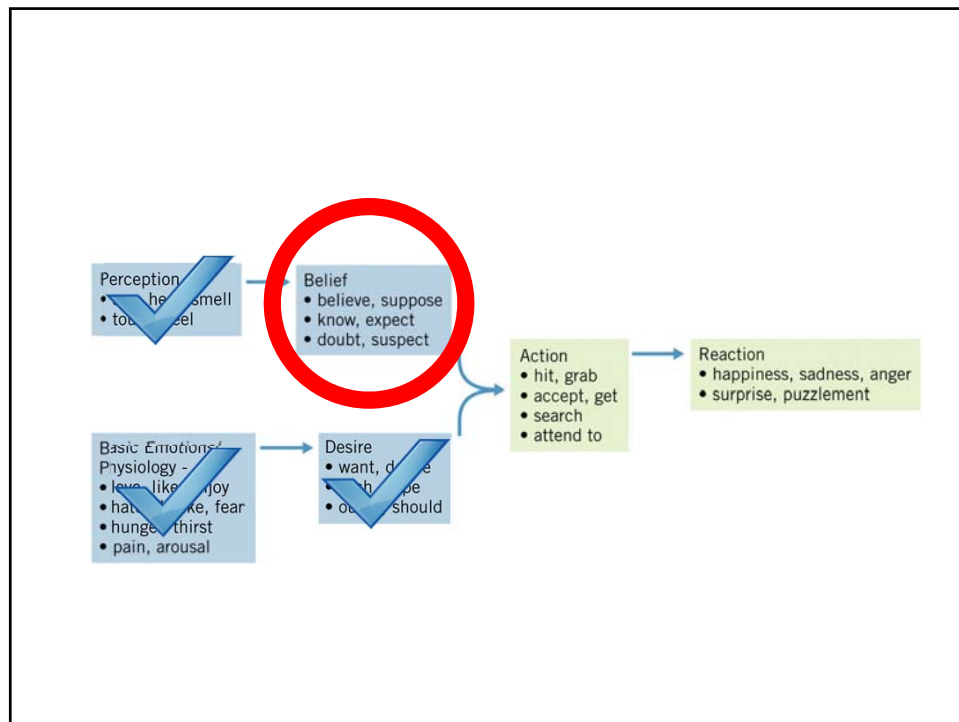
Infants' understanding of others' ...

Desires/preferences

- again, though, children have more to learn:
 - what if the infant's preference is different from that of somebody else? when do infants understand that people's desires/preferences can differ from their own?

[Repacholi and Gopnik (1997) video]

14 months: 85% of kids gave crackers
18 months: 30% of kids gave crackers



Why is understanding beliefs important to explaining others' actions?



- to explain his action (reaching for the cookies in the jar), we must know

- 1) his goal/desire (the cookies)
- 2) his beliefs (that the jar is on the counter and that there are cookies in the jar)

Why is understanding beliefs important to explaining others' actions?



A crucial feature of beliefs is that they can be true or false.

Beliefs are just representations of reality, not a direct reflection of it.

Why is understanding beliefs important to explaining others' actions?



What if the boy's mom moved the jar from the counter to the cupboard (without him noticing)?

The boy would have a false belief that the jar was on the counter.

This belief would make him reach on the counter.

Why is understanding beliefs important to explaining others' actions?



We (as adults) understand this mistake because we understand that the boy has a false belief (that the jar is on the counter).

But without an understanding that others can be mistaken about reality, his action **would not make sense**.

Why is understanding beliefs important to explaining others' actions?



Without an understanding that others have beliefs (that is, that other people's minds represent the world), we would just assume that everyone knows the true state of the world.

When do children understand false beliefs?

- For over 20 years, the widely accepted answer was “at age 4”

The change-of-location
false belief task
(aka the Sally-Anne task)

[movie]

The change-of-location false belief task

- 3-year-olds: BOX
(incorrect)
- 4-year-olds: BASKET
(correct)

Children younger than
4 can't reason about
others' false beliefs.



The unexpected-contents false belief task (aka the Smarties task)

[movie of a child who failed this task]

[movie of a child who passed this task]

The unexpected-contents false belief task

- What's in the box?
[child's guess is wrong]



- What will your friend Johnny think is in the box?
- What did you first think was in the box?

The unexpected-contents false belief task



- 3-year-olds: ANIMAL CRACKERS (incorrect)
- 4-year-olds: CRAYONS (correct)

Lying/deceiving

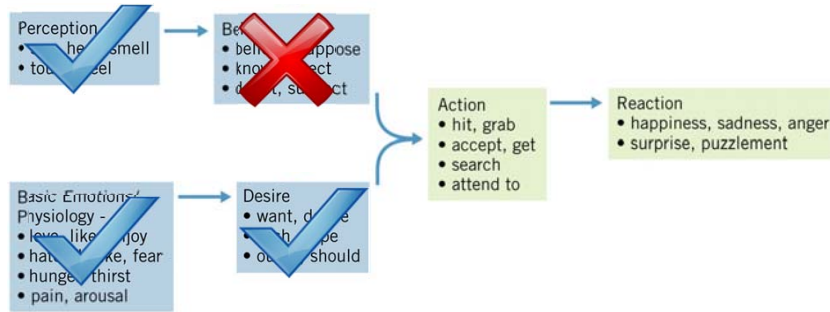
- Lying requires a representational theory of mind
 - Why?

Lying/deceiving

- Lying requires a representational theory of mind
 - Why?
 - Children can't deceive very well until they're 3 ½ - 4 years old.

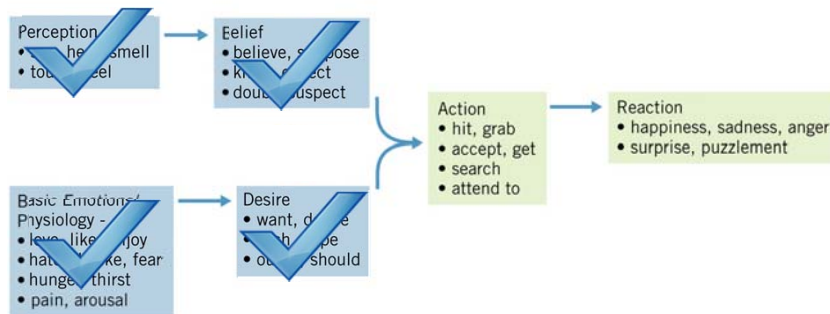
[video]

Theory of mind prior to age 4



However...

- Recent studies performed at the U of I show that even 15-month-olds can reason about false beliefs!!



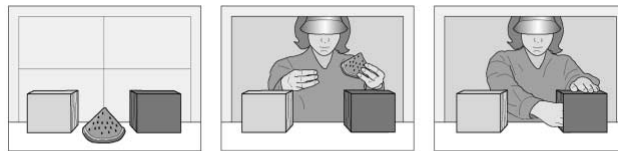
Onishi & Baillargeon (2005)

violation of expectation task

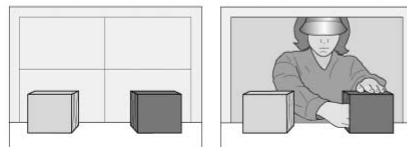
[movie](#)

Onishi & Baillargeon (2005)

A Familiarization trial 1

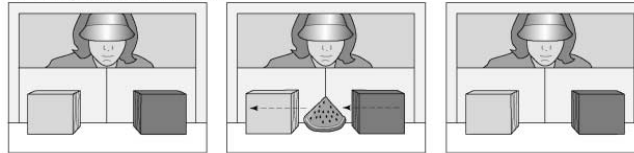


B Familiarization trials 2 and 3

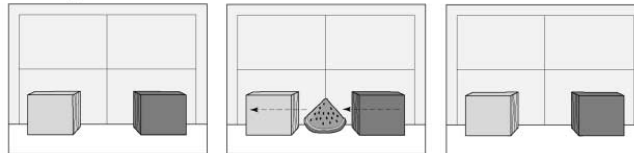


Onishi & Baillargeon (2005)

B TB-yellow condition

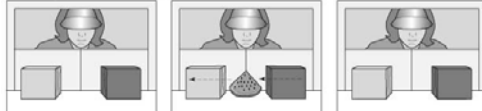


C FB-green condition

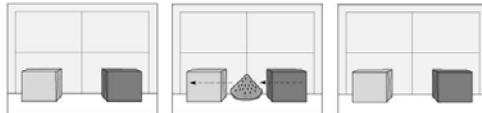


Onishi & Baillargeon (2005)

B TB-yellow condition

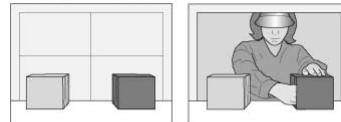


C FB-green condition

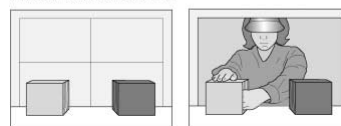


Test trial

Green-box condition



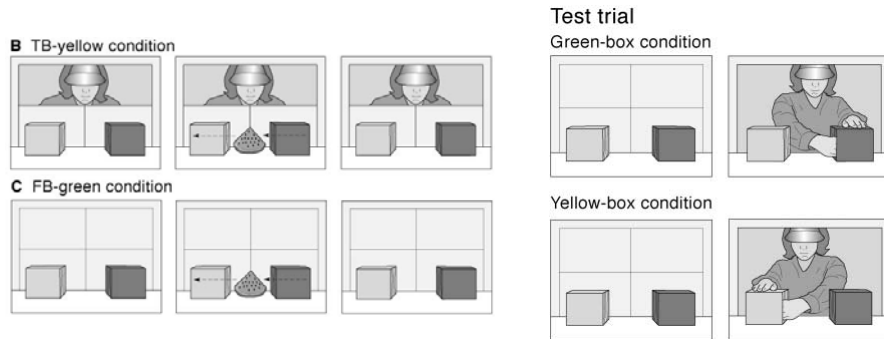
Yellow-box condition



True belief – yellow: look longer at reach into the green box

False belief – green: look longer at reach into the yellow box

Onishi & Baillargeon (2005)



15-month-olds expect the actor to search for the toy where she believes it is.

15-month-olds seem to have a representational (belief-desire) psychology!

What's going on?

- Why do 3-year-olds fail in the traditional false belief tasks?

Maybe these tasks are too hard (for reasons that don't have to do with children's understanding of false beliefs):

- lots of language
- multiple parties to keep track of (e.g., Sally, Anne, experimenter)
- explicit judgment task
- children have to inhibit their knowledge of where the toy really is

What's going on?

- If you make the task less complex, even 2-year-olds can succeed:
 - “Hmm, I wonder where Sally will look for the marble...” – children look to the correct location

Atypical development: Autism

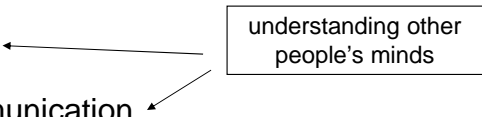
- 1 in 166 births
- 1-1.5 million people in the U.S.
- 10-17% annual increase

(Autism Society of America)

Core deficits in autism

- Social functioning
- Language and communication
- Repetitive behaviors
- Mental retardation

Core deficits in autism

- Social functioning
 - Language and communication
 - Repetitive behaviors
 - Mental retardation
- 
- A diagram consisting of a rectangular box on the right containing the text "understanding other people's minds". Two arrows originate from the left side of this box: one points horizontally to the left towards the bullet point "Social functioning", and the other points diagonally down and to the left towards the bullet point "Language and communication".

Core deficits in autism

Table 1. DSM-IV criteria for defining the social and communication deficits in autism

Social deficits	Language and communication deficits
Impairments in the use of eye gaze Impairments in facial expression Impairments in body posture and gesture Failure to form peer relationships at appropriate developmental level Lack of spontaneous sharing of enjoyment, interests, or achievements with others Lack of social-emotional reciprocity Impaired response to other people's emotions Lack of adapting behaviour to different social contexts Weak integration of social, emotional, and communicative behaviours	Delay or absence of spoken language Marked impairment in the ability to initiate or sustain conversation with others Idiosyncratic use of words or phrases Lack of varied spontaneous pretend play Lack of social imitative play at younger developmental stages

Tager-Flusberg, 1999

An autistic person's description of the Heider & Simmel movie

"Starts when a small equilateral triangle breaks out of a square. A small sphere or circle appears and slides down the broken rectangle. The triangles were either equilateral or isosceles. Later the small, I think, isosceles triangle and sphere bounce around each other, maybe because of a magnetic field..."

Klin & Jones, 2006

"MIND-BLINDNESS"

Impairment in reasoning about beliefs Baron-Cohen et al., 1985

- Autistic group
(12 years old; nonverbal MA = 9 years; verbal MA = 5 years)
- Down Syndrome
(11 years old; nonverbal MA = 6 years; verbal MA = 3 years)
- Typically developing controls
(4 years old)

Impairment in reasoning about beliefs Baron-Cohen et al., 1985



Impairment in reasoning about beliefs
Baron-Cohen et al., 1985

<i>Group</i>	<i>Percentage of children who answered correctly</i>
Autism	20%
Down	86%
Control	85%